What is claimed is:

1. A ruled line extraction apparatus, comprising:

a first binarization device generating a first binary image by binarizing a multiple-valued image;

a second binarization device generating a second binary image by binarizing the multiple-valued image in a method different from a method of said first binarization device;

an extraction device extracting a ruled line candidate area using the first binary image;

a determination device determining whether the extracted ruled line candidate area corresponds to a ruled line using the second binary image; and

an output device outputting information about a ruled line candidate area determined to correspond to a ruled line.

2. The apparatus according to claim 1, wherein

said first binarization device generates a rather expanded binary image as the first binary image, and said second binarization device generates a rather blurry binary image as the second binary image, and said determination device performs determination using the rather blurry

binary image and the multiple-valued image.

3. The apparatus according to claim 2, wherein said determination device obtains a gray level difference between a black pixel area and a white pixel area in the rather blurry binary image in a scope of the ruled line candidate area, and regards a pixel in the white pixel area as a black pixel when the gray level difference is smaller than a threshold.

4. The apparatus according to claim 3, wherein said determination device determines that the ruled line candidate area corresponds to a ruled line when a ratio of black pixels in the ruled line candidate area is larger than a predetermined value.

5. The apparatus according to claim 3, wherein said determination device obtains density of black pixels in an area of a rather blurry binary image corresponding to an area encompassing the black pixel area and white pixel area, changes the threshold into a larger value when the density of black pixels is equal to or larger than a predetermined value, and changes the threshold into

a smaller value when the density of black pixels is smaller than the predetermined value.

6. The apparatus according to claim 2, wherein said determination device obtains a black pixel area and a white pixel area in the rather blurry binary image in a scope of the ruled line candidate area, obtains density of black pixels in an area of a rather expanded binary image corresponding to an area encompassing the black pixel area and white pixel area, obtains a gray level difference between the black pixel area and the white pixel area if the density of black pixels is equal to or larger than a predetermined value, and regards a pixel in the white pixel area as a black pixel if the gray level difference is smaller than the predetermined value.

7. The apparatus according to claim 1, wherein said second binarization device binarizes an area in the multiple-valued image corresponding to a position of the ruled line candidate area, and partially generates the second binary image.

8. The apparatus according to claim 1, further

comprises

a device extracting a pattern larger than a predetermined value from a binary image in an area between a vertical ruled line candidate area and a horizontal ruled line candidate area determined to correspond to ruled lines when a distance between the vertical ruled line candidate area and the horizontal ruled line candidate area is smaller than a predetermined value, wherein

said output device outputs the extracted pattern as a corner portion.

9. A ruled line extraction apparatus, comprising:

an extraction device extracting an area to be determined from a multiple-valued image;

a determination device obtaining an evaluation value on a contour portion of a ruled line contained in the area to be determined based on a change of a gray level in a direction vertical to the ruled line, determining the area to be a necessary ruled line area if the evaluation value is equal to or larger than a predetermined value, and determining the area to be an unnecessary ruled line area if the evaluation value is smaller than the predetermined value; and

an output device outputting information about the necessary ruled line area.

10. A ruled line extraction apparatus, comprising:

an extraction device extracting an area to be determined from a multiple-valued image;

a determination device obtaining an evaluation value on a contour portion of a ruled line contained in the area to be determined based on a change of a gray level in directions vertical to and parallel to the ruled line, determining the area to be a necessary ruled line area if the evaluation value is equal to or larger than a predetermined value, and determining the area to be an unnecessary ruled line area if the evaluation value is smaller than the predetermined value; and

an output device outputting information about the necessary ruled line area.

11. A ruled line extraction apparatus comprising:

an extraction device extracting a plurality of areas to be determined from a multiple-valued image;

a determination device obtaining an evaluation value on a contour of a ruled line contained in

each area to be determined based on a change of a gray level in a direction vertical to the ruled line, dividing the plurality of areas to be determined into two groups based on distribution of evaluation values, determining that an area to be determined which belongs to a group of a larger evaluation value is a necessary ruled line area, and determining that an area to be determined which belongs to a group of a smaller evaluation value is an unnecessary ruled line area; and

an output device outputting information about the necessary ruled line area.

12. A pattern extraction apparatus, comprising:

an extraction device extracting an area to be determined from a multiple-valued image;

a determination device obtaining an evaluation value on a contour portion of a pattern contained in the area to be determined based on a change of a gray level in a direction vertical to a tangent direction of a contour line, determining that the area to be determined is a necessary pattern area if the evaluation value is equal to or larger than a predetermined value, and determining that the area to be determined is an unnecessary pattern

area if the evaluation value is smaller than the predetermined value; and

an output device outputting information about the necessary pattern area.

13. An image processing apparatus, comprising:

a first binarization device performing a local binarization on a multiple-valued image;

a second binarization device performing local binarization again on a pixel regarded as a white pixel in a vicinal area of a target pixel when the target pixel is regarded as a white pixel in the local binarization by said first binarization device; and

an output device outputting a process result of said second binarization device.

14. An image processing apparatus, comprising:

a first binarization device performing local binarization on a multiple-valued image;

a second binarization device performing local binarization again by changing a form of a vicinal area of a target pixel when the target pixel is regarded as a white pixel in the local binarization by said first binarization device; and

an output means outputting a process result of said second binarization device.

15. An image processing apparatus, comprising:

a first binarization device performing local binarization on a multiple-valued image;

a determination device determining whether local binarization is to be performed again by comparing average gray levels between black pixels and white pixels in a vicinal area of a target pixel when the target pixel is regarded as a white pixel in the local binarization by said first binarization device; and

a second binarization device performing local binarization on a pixel regarded as a white pixel in the vicinal area when it is determined that the local binarization is to be performed again.

16. An image processing apparatus, comprising:

a determination device determining whether a target pixel is a background based on complexity of a pattern in a vicinal area of a target pixel in local binarization of a multiple-valued image;

a binarization device performing the local binarization based on a determination result of

said determination device; and

an output device outputting a process result of said binarization device.

17. An image processing apparatus, comprising:

a binarization device performing local binarization on a multiple-valued image;

a determination device setting in a vicinal area of a target pixel at least one of a vertically-long area and a horizontally-long area containing the target pixel when the target pixel is regarded as a white pixel in the local binarization, and determining the target pixel to be a black pixel when a ratio of black pixels in the set area is larger than a predetermined value; and

an output device outputting a process result.

18. A computer-readable storage medium storing a program used to direct a computer to perform a process, said process comprising:

generating a first binary image by binarizing a multiple-valued image;

generating a second binary image by binarizing the multiple-valued image in a method different

from a method of said first binary image;

extracting a ruled line candidate area using the first binary image;

determining whether the extracted ruled line candidate area corresponds to a ruled line using the second binary image; and

outputting information about a ruled line candidate area determined to correspond to a ruled line.

19. A computer-readable storage medium storing a program used to direct a computer to perform a process, said process comprising:

extracting an area to be determined from a multiple-valued image;

obtaining an evaluation value on a contour portion of a pattern contained in the area to be determined based on a change of a gray level in a direction vertical to a tangent direction of a contour line;

determining that the area to be determined is a necessary pattern area if the evaluation value is equal to or larger than a predetermined value;

determining that the area to be determined is an unnecessary pattern area if the evaluation value

is smaller than the predetermined value; and

outputting information about the necessary pattern area.

20. A propagation signal for propagating a program used to direct a computer to perform a process, said process comprising:

generating a first binary image by binarizing a multiple-valued image;

generating a second binary image by binarizing the multiple-valued image in a method different from a method of said first binary image;

extracting a ruled line candidate area using the first binary image;

determining whether the extracted ruled line candidate area corresponds to a ruled line using the second binary image; and

outputting information about a ruled line candidate area determined to correspond to a ruled line.

21. A propagation signal for propagating a program used to direct a computer to perform a process, said process comprising:

extracting an area to be determined from a

multiple-valued image;

obtaining an evaluation value on a contour portion of a pattern contained in the area to be determined based on a change of a gray level in a direction vertical to a tangent direction of a contour line;

determining that the area to be determined is a necessary pattern area if the evaluation value is equal to or larger than a predetermined value;

determining that the area to be determined is an unnecessary pattern area if the evaluation value is smaller than the predetermined value; and

outputting information about the necessary pattern area.

22. A method for extracting a ruled line, comprising:

generating a first binary image by binarizing a multiple-valued image;

generating a second binary image by binarizing the multiple-valued image in a method different from a method of said first binary image;

extracting a ruled line candidate area using the first binary image;

determining whether the extracted ruled line

candidate area corresponds to a ruled line using the second binary image; and

outputting information about a ruled line candidate area determined to correspond to a ruled line.

23. A method for extracting a pattern, comprising:

extracting an area to be determined from a multiple-valued image;

obtaining an evaluation value on a contour portion of a pattern contained in the area to be determined based on a change of a gray level in a direction vertical to a tangent direction of a contour line;

defining the area to be determined as a necessary pattern area if the evaluation value is equal to or larger than a predetermined value;

defining the area to be determined as an unnecessary pattern area if the evaluation value is smaller than the predetermined value; and

outputting information about the necessary pattern area.

24. A ruled line extraction apparatus, comprising:

first binarization means for generating a

first binary image by binarizing a multiple-valued image;

second binarization means for generating a second binary image by binarizing the multiple-valued image in a method different from a method of said first binarization means;

extraction means for extracting a ruled line candidate area using the first binary image;

determination means for determining whether the extracted ruled line candidate area corresponds to a ruled line using the second binary image; and

output means for outputting information about a ruled line candidate area determined to correspond to a ruled line.

25. A pattern extraction apparatus, comprising:

extraction means for extracting a area to be determined from a multiple-valued image;

determination means for obtaining an evaluation value on a contour portion of a pattern contained in the area to be determined based on a change of a gray level in a direction vertical to a tangent direction of a contour line, determining that the area to be determined is a necessary pattern area if the evaluation value is equal to or

larger than a predetermined value, and determining that the area to be determined is an unnecessary pattern area if the evaluation value is smaller than the predetermined value; and

output means for outputting information about the necessary pattern area.